Empirical Evidence on Capital Mobility in Four ASEAN Countries

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Abstract

This paper examines the degree of capital mobility in four ASEAN countries, namely, Malaysia, Singapore, Thailand and the Philippines. The model of Shibata and Shintani (1998) and the extension model by Cooray (2005) are used to examine the degree of international capital mobility in these countries. The results show that capital seems to be mobile in Malaysia and Thailand, but not in the Philippines or Singapore. Nevertheless, the results suggest that the interest rate differential is not related to changes in consumption. This paper also highlights the importance of incorporating strong instrumental variables in any GMM estimations.

Keywords: Capital Mobility, Shibata and Shintani model, interest rate differential

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I. Introduction

Using the model developed by Shibata and Shintani (1998) and the extension model by Cooray (2005), this paper aims to measure the degree of capital mobility in four ASEAN countries, namely, Malaysia, Singapore, Thailand and the Philippines.

This paper is motivated by two concerns. Firstly, the Shibata and Shintani model is a more recent approach which consists of assessing capital mobility in terms of the correlation between a country's consumption and net output. Previous studies of international capital mobility in developing countries focused on the saving-investment (S-I) framework developed by Feldstein and Horioka (1980) (Anoruo,2001; Kumari,2004; Chan,2001; Tan,2000; Ho,1999; Tsung,1999; Mamingi,1997 and Bagnai and Manzocchi, 1996). However, the Feldstein and Horioka model suffers from several limitations. Many analysts have argued that common shocks such as productivity shocks and fiscal policy shocks to investment and saving may cause positive saving-investment correlations even under perfect capital mobility.

Secondly, empirical studies have often failed to provide rigorous empirical evidence of the degree of capital mobility for developing countries such as the ASEAN economies. For example, tests involving nominal interest rate comparisons, consumption correlation and consumption smoothing models generally indicate a high degree of capital mobility in Malaysia (De Brouwer, 1999; Ghosh & Ostry, 1995; Goh, 2007; Goh et al., 2006), while those involving saving-investment relationships show relatively low levels of capital mobility in Malaysia (Mamingi, 1997; Bagnai and Manzocchi, 1996).

Similarly, using various models[1], MAS (2000) found capital is mobile in Singapore, while using saving-investment analysis with cointegration tests, Anoruo (2001) and Tan (2000) found that capital is immobile in Singapore.

This paper intends to provide additional empirical evidence on international capital mobility in two Asian countries, namely Malaysia and Singapore, by employing the model of Shibata and Shintani and the extension model by Cooray, which focuses on a new measure and test of international capital mobility. Using the permanent income model of Campbell and Mankiw (1989, 1990, 1991) with a version of an intertemporal current account, Shibata and Shintani focus on the correlation between the changes in a country's consumption and the changes in its net output. Their model predicts that if capital mobility is perfect, then consumption changes are independent of net output changes. Estimating the model for a sample of 11 OECD countries, Shibata and Shintani found the null hypothesis of perfect capital mobility cannot be rejected for more than half of these countries.

Cooray (2005) had extended this model by incorporating the effect of interest rate differential on consumption. Cooray proposed that if the domestic interest rate is higher than the foreign interest rate, there will be a capital inflow, a currency appreciation and a fall in domestic consumption, and vice versa. Using the extension model, Cooray examines the degree of capital mobility in four South Asia countries: namely, India, Sri Lanka, Pakistan and Bangladesh. The results suggest that, in general, capital is immobile in these countries.

[1] Several models are employed in this study to examine the mobility of capital in Singapore. Models adopted in this study include international parity condition, consumption smoothing, consumption correlation and saving-investment correlation test.

This paper is structured as follows. Section II presents the model. Section III explains the data employed in this study. Section IV reports the empirical results, and Section V summarizes the conclusions.

II. The model

The model of Shibata and Shintani is developed by employing a basic model with a small open economy version of the permanent income model with imperfect international capital mobility. Assuming a world interest rate of *i*, a country's limit budget is given by:

$$F_{t+1} = (1+i)F_t + GDP_t - C_t - I_t - G_t$$

$$F_{t+1} = (1+i)F_t + V_t - C_t \qquad (1)$$

where F_t = foreign asset holdings, GDP_t = gross domestic product, C_t = private consumption, I_t = investment, G_t = government consumption, $V_t \equiv GDP_t - G_t - I_t$ and V_t = a country's net output.

From the national income accounting identity, it shows:

$$CA_t \equiv iF_t + V_t - C_t \qquad (2)$$

where CA = the current account.

There are two polar cases: perfect international capital mobility and financial autarky. If we assume that the utility function is quadratic and the consumers' discount rate and the world interest rate are equal, optimal consumption in the case of perfect capital mobility can be written as:

$$C_t^* = i\left\{ F_t + (\frac{1}{1+i})\sum_{n=0}^{\infty}(\frac{1}{1+i})^n E_t V_{t+n} \right\} \qquad (3)$$

where $E_t V_{t+n}$ represents the future expectation of net output. By differentiating Equation (3), we get

$$\Delta C_t^* = \frac{1}{1+i}\sum_{n=0}^{\infty}(\frac{1}{1+i})^n (E_t - E_{t-1})V_{t+n} \qquad (4)$$

where $(E_t - E_{t-1})V_{t+n}$ is the change of expectations from time *t*-1 to *t*. However, the value at time *t*-1 is unpredictable under rational expectations. Thus, Equation (5) can be written as:

$$\Delta C_t^* = e_t \qquad (5)$$

where e_t is a rational forecast error, which is orthogonal to the information available at time *t*-1.

Under perfect capital mobility, the current account can be derived from Equation (1) – (3). Then, the optimal current account can be expressed as:

$$CA_t = -(\frac{i}{1+i})\sum_{n=0}^{\infty}(\frac{1}{1+i})^n E_t(V_{t+n} - V_t)$$

$$= -\sum_{n=1}^{\infty}(\frac{1}{1+i})^n E_t(\Delta V_{t+n}) \qquad (6)$$

Equation (6) implies that if ΔV follows a stationary process, then the current account follows a stationary process as well, under perfect capital mobility. Note that the current account and consumption are determined by future expectations of net output. In the case of financial autarky, there are no capital movements between countries at all. Therefore, a country's consumption is constrained by its current net output:

$$C_t^a = V_t \qquad (7)$$

This implies that the trade balance is:

$$TB_t \equiv CA_t - iF_t \qquad (8)$$

where TB_t is a trade balance that always equals zero. This means that domestic saving is equal to domestic investment.

Aggregate consumption in the case between the two polar cases where capital is mobile but not perfectly mobile across countries is given by:

$$C_t = (1-\delta)C_t^* + \delta C_t^a = (1-\delta)C_t^* + \delta V_t \qquad (9)$$

Note that δ measures the degree of international capital mobility. The value of δ ranges between zero and unity. The smaller (larger) the value of δ, the higher (lower) the degree of international capital mobility of a country. If the value of δ is zero (unity), it means perfect capital mobility (capital immobile). Note that in Equation (9), C_t^* depends on unobservable terms, which is $E_t V_{t+n}$ (n = 1, 2, …). By differentiating both sides of Equation (9), we find:

$$\Delta C_t = (1-\delta)\Delta C_t^* + \delta \Delta C_t^a = (1-\delta)e_t + \delta \Delta V_t \qquad (10)$$

where ΔC_t describes the changes in aggregate consumption. Shibata and Shintani examine the degree of international capital mobility by estimating the value of δ.

Cooray (2005) has extended Equation (10) to incorporate the interest rate differential. With the incorporation of the interest rate differential, it would imply that if the domestic interest rate is higher than the foreign interest rate, there will be a capital inflow, a currency appreciation and a loss of competitiveness in the international market

that leads to a fall in aggregate demand and therefore consumption or vice versa. The extended model is:

$$\Delta C_t = (1-\delta)[e_t + (i - i_f)] + \delta \Delta V_t \qquad (11)$$

where i = domestic interest rate and i_f = world interest rate. If the interest rate differential is statistically significant (insignificant), it could imply that the interest rate differential appears (does not appear) to affect the changes in consumption.

III. Data

Four ASEAN countries were selected to test the country's capital mobility: namely, Malaysia, Singapore, Thailand and the Philippines. Annual data from 1960 to 2004 have been taken from *International Financial Statistics* for all sample countries. The data for the net output of a country have been constructed by subtracting the government consumption expenditure, gross fixed capital formation and the changes in inventories from gross domestic product (GDP) and deflating by the consumer price index (CPI). The differences between the domestic interest rate and foreign interest rate are constructed by subtracting the world interest rate from the domestic interest rate; the money market rates are used for all four countries and the United State Federal Funds Rate is used to represent the world interest rate.

IV. Empirical results

Prior to the estimation of equation (10) and equation (11) using OLS, we need to examine the stationarity for the first difference of consumption (ΔC) and net output (ΔV) as well as the interest rate differential (i-i_f). Both the Augmented Dickey Fuller and the

Phillips Perron test are used. Table 1 reports the results. The results suggest that all series are I(0) except the interest rate differential in Malaysia which is I(1). This result is consistent with Goh et al (2006) who found an I(1) for $(i\text{-}i_f)$ in Malaysia.

Table 1: Unit Root Test

Country	ΔC		ΔV		$i\text{-}i_f$		• $i\text{-}i_f$	
	ADF	**PP**	**ADF**	**PP**	***ADF***	***PP***	**ADF**	**PP**
Malaysia	-4.63***	-4.52***	-4.09***	-4.07***	-2.876	-2.28	-4.99***	-4.61***
Singapore	-4.43***	-4.32***	-3.39**	-3.37**	-3.38***	-3.26**		
Thailand	-3.47**	-3.17**	-3.95***	-3.44**	-3.29***	-2.98**		
Philippines	-4.87***	-4.75***	-4.55***	-3.53**	-4.09***	-3.26**		

Note: The ADF test is based on the following model, $\Delta x_t = \beta_0 + \beta_1 x_{t-1} + \sum_{i=1}^{T} \beta_2 \Delta x_{t-i} + \varepsilon_t$

The PP test is based on the following model, $x_t = \beta_0 + \beta_1 x_{t-1} + \varepsilon_t$

The MacKinnon (1991) t-critical values for the ADF tests for the sample size of 50 with a constant are 1% -3.58, 5% -2.93 and 10% -2.60, with constant and trend are 1% -4.15, 5% -3.50 and 10% -3.18

*, **, *** denotes statistical significance at the 10%, 5% and 1% levels respectively.

Equation (10) and (11) were estimated using OLS and GMM techniques. Shibata and Shintani noted that the error term e_t may be correlated with ΔV since higher output usually implies good news for the country's expected future net output. The GMM estimation method is employed to discard the potential inconsistencies in the OLS estimates.

It is important to incorporate a good set of instrumental variables in the GMM estimation. An instrumental variable must satisfy two requirements: (i) it must be orthogonal to the error process, which is also known as "instrument exogeneity"; (ii) it must be correlated with the included endogenous variables, which is also known as "instrument relevance". The formal condition of instrument exogeneity is readily tested

by examining the J-statistics, which are reported in most statistical packages such as Eviews[2].

The issue of relevant instrumental variables has been the subject of much recent research in econometrics. It has been found that if the instrumental variables are weak (i.e. they are weakly correlated or uncorrelated with the corresponding endogenous variables), then the statistical properties of GMM can be very poor. In particular, coefficient estimates can be very biased and significance tests unreliable. A simple rule of thumb for checking for relevance instruments is to estimate an OLS regression of the endogenous on the full set of instrumental variables, and obtain the F statistics of the excluded instruments in this regression.[3] If this F statistic is less than 10, this is taken as evidence of instrumental variables being a weak instrumental variable and the GMM estimates should not be trusted. In this paper, both instrument relevance and instrument exogeneity were checked before we determined the robustness of the GMM estimates.

In the literature, most authors used the lagged of endogenous variables as instrumental variables (for example, Shibata and Shintani,1988; Bayoumi and MacDonald, 1995; Cooray, 2005). We tested this approach and found that the lagged of endogenous variables are weak instrumental variables for all countries.[4] We then adopted a new set of instrumental variables for all sample countries. These variables were the openness of the US, the growth rate of real GDP per capita in the US and the US consumption share of real GDP. Our intuition is that since the US is a major trading

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[2] *J*-statistic is the value of the GMM objective function, evaluated at the estimated coefficients. The J statistics reported in Eviews are multiplied by n.

[3] For models with multiple endogenous variables, the F statistics may not be sufficiently informative.

[4] The GMM estimation results with lag of endogenous variables as instrumental variables are shown in Appendix 1.

partner for all sample countries, changes in the openness, growth rate of real GDP per capita and consumption in US may affect the level of GDP and hence consumption for all sample countries.

Table 2 reports the estimation results for equation (10) using both the OLS and GMM methods. According to the OLS estimation, the estimated coefficient on net output is very small for the sample countries. The *t*-statistics suggest that the null hypothesis of perfect capital mobility (δ=0) cannot be rejected for Malaysia and Thailand, which suggest evidence of capital mobility in these two countries. The null hypothesis is rejected for Singapore and Philippine at the 1% significance level but the point δ estimates are not so large (0.26 for Singapore and 0.42 for the Philippines). The last two columns of Table 2 show the GMM estimates of the value δ. It is found that both sets of instrumental variables are relatively weak for Thailand and the Philippines (the F statistics are less than 10) and thus the GMM estimates should not be trusted for these two countries. On the other hand, the F statistics show both set of instrumental variables are relevant instrumental variables for Malaysia and Singapore. The J statistics also indicate that the null hypothesis of the instruments variables are exogenous is not rejected for both Malaysia and Singapore. The GMM estimations suggest the δ estimates remain small for Malaysia and Singapore (closer to zero than to one) although the null hypothesis of perfect capital mobility is rejected for both sets of instruments for Singapore. Again the GMM estimates suggest that there is little evidence against perfect capital mobility for Malaysia. Overall, the results indicate that capital is relatively mobile in Malaysia and Thailand, but there are capital restrictions in Singapore and the Philippines.

Table 2: Consumption-net output correlations (Equation 10)

Country	Sample Period		OLS estimates	GMM estimates	
				IV(1)	IV(2)
Malaysia	1961-2004	δ	0.01 (0.11)	0.10(0.74)	0.072(0.50)
		R^2	0.0003	-0.1068	-0.077
		J-statistics (p-value)	-	3.6714 (0.1594)	3.4734 (0.1023)
		F-statistics		11.8467	10.9311
Singapore	1961-2004	δ	0.26 (3.62)	0.425 (4.72)	0.426(4.72)
		R^2	0.238	0.1362	0.1364
		J-statistics (p-value)	-	1.0668 (0.5865)	1.0366 (0.3085)
		F-statistics		19.292	28.196
Thailand	1961-2004	δ	-0.17 (-0.83)	1.019 (8.57)	1.076(6.814)
		R^2	0.03	-1.0228	-1.168
		J-statistics (p-value)	-	2.30 (0.5111)	1.43 (0.3718)
		F-statistics		6.767	8.578
Philippines	1961-2004	δ	0.415 (4.66)	0.657 (4.07)	0.7525(3.79)
		R^2	0.34	0.222	0.115
		J-statistics (p-value)	-	1.818 (0.9281)	0.1999 (0.6547)
		F-statistics		6.709	8.967

Note: *t*-statistics are reported in parentheses.

Equation (10): $\Delta C_t = (1-\delta)e_t + \delta \Delta V_t$

The sets of instrumental variables (IV) used in the GMM estimation are
IV (1) {US's openness, US's growth rate of real GDP per capita and US consumption share of real GDP}
IV (2) {US's growth rate of real GDP per capita and US consumption share of real GDP}
The J statistics reported in Eviews are multiplied by n. The p-values of the J statistics are reported in parentheses.

We further estimate Cooray's model of Equation (11). The results are presented in Table 3. The results for the OLS estimates do not differ much from estimates from Equation (10). The estimated coefficients on net output remain small for the sample countries. These results are not surprising since the interest rate differential is statistically insignificant for all sample countries, implying that this differential is not associated with

the growth rate of consumption for these countries.[5] For the GMM estimates, the F statistics show that both sets of instrumental variables are relevant for Singapore but not for Thailand, the Philippines or Malaysia.[6] The GMM estimations suggest the δ estimates remain small for Singapore although the null hypothesis of perfect capital mobility is rejected for both sets of instruments for Singapore. Again the OLS and the GMM estimates suggest that there is evidence against perfect capital mobility in Singapore.

Table 3: Consumption-net output correlations with interest rate differential (Equation 11)

Country	Sample Period		OLS estimates	GMM estimates	
				1	2
Malaysia	1971-2004	δ	-0.06 (-0.55)	-0.11(-0.83)	0.43(3.84)
		γ	-0.43 (-1.04)	-0.31(-1.35)	0.19 (0.94)
		R^2	0.04	-	-
		J-statistics (p-value)	-	3.46 (0.3257)	3.926 (0.140)
		F-statistics		6.93	6.77
Singapore	1972-2004	δ	0.25 (2.81)	0.552 (4.138)	0.5568 (4.22)
		γ	-0.272 (-1.26)	-0.07 (-0.538)	-0.106 (-0.643)
		R^2	0.22	-	-
		J-statistics (p-value)	-	2.222(0.5275)	2.147 (0.3417)
		F-statistics		10.347	15.633
Thailand	1977-2004	δ	0.007 (0.03)	0.202 (0.199)	0.235 (0.292)
		γ	-12.902 (-1.79)	-58.20(-1.35)	-43.385(-1.29)
		R^2	0.14	-1.45	-0.5128
		J-statistics (p-value)	-	0.6598 (0.99)	1.52e-25
		F-statistics		5.007	6.827
Philippines	1977-2004	δ	0.43 (3.53)	0.461(1.67)	0.715 (1.237)
		γ	1.128 (0.53)	6.12 (1.08)	1.30 (0.121)
		R^2	0.35	0.19	0.19
		J-statistics (p-value)	-	0.149(0.928)	2.53e-25 (0.99)

[5] Similarly in his paper, Cooray found the interest rate differential is not related to changes in consumption in four South Asia countries, namely, India, Sri Lanka, Pakistan and Bangladesh.
[6] We assumed the interest rate differential as an exogeneous variable in estimating equation 11.

F-statistics	4.062	4.062

t-statistics are reported in parentheses

Equation (11): $\Delta C_t = (1-\delta)[e_t + (i - i_f)] + \delta \Delta V_t$

The sets of instrumental variables (IV) used in the GMM estimation are
IV (1) {US's openness, US's growth rate of real GDP per capita and US consumption share of real GDP, interest rate differential}
IV (2) {US's growth rate of real GDP per capita and US consumption share of real GDP, interest rate differential}
The J statistics reported in Eviews are multiplied by n. The p-values of the J statistics are reported in parentheses.

V. Concluding remarks

This paper applies the most recent measure of international capital mobility, Shibata and Shintani (1998), and the extension model by Cooray (2005) which focused on the correlation between consumption and net output, on a group of four ASEAN countries: namely, Malaysia, Singapore, Thailand and the Philippines.

Two important conclusions can be drawn from this paper. Firstly, it is deemed important to incorporate a strong set of instrumental variables in the GMM estimation. Secondly, the results indicate that the null hypothesis of perfect international capital mobility cannot be rejected for Malaysia and Thailand whereas the null hypothesis of perfect capital mobility is rejected for Singapore and the Philippines. The result for Singapore and the Philippines may come as a surprise. As compared to other developing countries, Singapore, Malaysia, Thailand, and the Philippines have taken major steps to deregulate and liberalise their financial markets. Singapore was the first to begin liberalizing by removing and lifting interest rate regulations and abolishing exchange controls in the mid 1970s. Malaysia followed soon after, taking major steps towards deregulating the financial markets in the late 1970s and the Philippines and Thailand did so in the early 1980s.

Although financial liberalization was undertaken at a "stop-go-stop" pace consistent with the Malaysian economic needs and major economic global events that occurred at that time,[7] our results reinforce the recent findings in the literature (De Brouwer, 1999; Ghosh & Ostry, 1995; Goh, 2007; Goh et al., 2006) that Malaysia has exhibited a substantial amount of, at least, de facto financial openness despite the periodic exchange controls.

References:

1. Anoruo, E. (2001). Saving-investment connection: evidence from the ASEAN countries. *American Economist, 45*(1):46-53.
2. Bagnai, A. and Manzocchi, S. (1996). Unit root tests of capital mobility in the less developed countries. Wetwirschaftliches Archiv, 132(2): 545-557.
3. Bayoumi, T and McDonald, R. (1995). Consumption, Income, and International Capital Market Integration. IMF Staff Paper, 42(3):552-576.
4. Campbell, J.Y., Mankiw, N.G., 1989. Consumption, income, and interest rates: reinterpreting the time series evidence. NBER Macroeconomics Annual:185-216.
5. Campbell, J.Y., Mankiw, N.G. 1990. Permanent income, current income, and consumption. Journal of Business Economics Statistics, 8:265-279.
6. Campbell, J.Y., Mankiw, N.G., 1991. The response of consumption to income: A cross-country investigation. European Economic Review, 35:723-767.
7. Cooray, A. (2005). Capital mobility: evidence from four South Asian economies. *Applied Economics Letters, 12:* 577-581.
8. DeBrouwer, G. (1999). Financial Integration in East Asia. Cambridge: New York and Melbourne: Cambridge Unviersity Press.
9. Feldstein, M., & Horioka, C. (1980). Domestic saving and international capital flows. *The Economic Journal, 90:* 314-329.
10. Goh, S. K., Lim, G. C., & Olekalns, N. (2006). Deviations from uncovered interest parity in Malaysia. *Applied Financial Economics*, 16:745-759.
11. Goh, S.K. (2007). Intertemporal Consumption Smoothing and Capital Mobility: Evidence from Malaysia" Journal of Business and Public Affairs, Volume 1, issue 1.
12. Ghosh, A.R. and Ostry, J.D. " The current account in developing countries: A perspective from the consumption smoothing approach" World Bank Economic Review, 1995, 9(2):305-33.
13. Ho, T. W. (1999). Export-orientation and investment-saving correlation: a case of Taiwan. *Applied Economics, 31:* 805-813.
14. Kumari, S. (2004). *The saving - investment correlation and capital mobility in Asia.* unpublished thesis, Universiti Putra Malaysia, Kuala Lumpur.

[7] There have been two distinct periods of capital control in Malaysia, 1994-1996, and 1998-2004.

15. Mamingi, N. " Saving-Investment Correlations and Capital Mobility: The Experience of Developing Countries, Journal of Policy Modelling,1997, 19(6):605-26.
16. Monetary Authority of Singapore, (2000). Financial market Integration in Singpore: The Narrow and the Broad Views. Occasional Paper No.20.
17. Shibata, A., & Shintani, M. (1998). Capital mobility in the world economy: an alternative test. *Journal of International Money and Finance, 17:* 741-756.
18. Stock, J.H. and M.Watson (2006), *Introduction to Econometrics* , 2nd edn, Addison-Wesley
19. Tan, H. B. (2000). Savings, investments and capital flows: evidence from ASEAN 5. *Ashgate Publishing Company, Aldershot:*79-110.
20. Tsung, W. H. (1999). Export-orientation and saving-investment correlation: a case for Taiwan. *Applied Economics, 31:* 805-813.

Appendix 1: Consumption-net output correlations

Country	Sample Period		OLS estimates	GMM estimates		
				I	II	III
Malaysia	1971-2004	δ	-0.04 (-0.42)	0.688 (3.76)	0.702 (4.66)	-0.179(-1.15)
		R^2	0.006	-	-	-
		J-statistics (p-value)	-	2.445(0.488)	0.9814(0.805)	3.657(0.3009)
		F-statistics		1.7644	1.9418	4.8232
Singapore	1972-2004	δ	0.23 (2.58)	0.531 (9.75)	0.401(4.51)	0.417(6.32)
		R^2	0.18	-	-	-
		J-statistics (p-value)		2.136(0.544)	1.073(0.783)	1.642(0.300)
		F-statistics	-	9.084	5.415	8.464
Thailand	1977-2004	δ	-0.17 (-0.83)	1.464 (4.42)	1.261 (1.416)	1.464(4.42)
		R^2	0.03	-	-	
		J-statistics (p-value)		2.395 (0.494)	2.031(0.559)	2.395(0.494)
		F-statistics	-	6.004	5.773	6.004
The Philippines	1977-2004	δ	0.43 (3.65)	0.693(3.18)	0.035(0.212)	0.51(2.87)
		R^2	0.34	-	-	-
		J-statistics (p-value)		5.09(0.165)	2.06(0.52)	3.61(0.306)
		F-statistics	-	1.265	2.668	5.659

t-statistics are reported in parentheses

Equation (10): $\Delta C_t = (1-\delta)e_t + \delta \Delta V_t$

The sets of instrumental variables (IV) used in the GMM estimation are {constant, ΔCt-1, ΔCt-2, ΔV_{t-1} , ΔV_{t-2}}for I and {constant, ΔV_{t-1},…, ΔV_{t-4}} for II, {constant, Δc_{t-1},…, Δc_{t-4}} for III.

The J statistics reported in Eviews are multiplied by n. The p-values of the J statistics are reported in parentheses.